

## REMARKS

Claims 1-7, 9-17, 19-20, 25-26 and 31-70 are pending. In this Response, claims 1, 6, 11, 16, 31, 47, 51 and 67 have been amended.

### I. SECTION 102 REJECTIONS – RAO

Claims 6-7, 9-10, 16-17, 19-20, 51-62 and 64-70 are rejected under 35 U.S.C. § 102(e) as being anticipated by *Rao* (U.S. Patent 6,040,650).

*Rao* discloses stator windings for electric machines such as brushless and brushed type DC motors and generators.

Prior art axial gap motor 10 includes rotating permanent magnet disks 1 and 2 and stator ring 3. Permanent magnet disks 1 and 2 are separated from stator ring 3 by air gaps 4 and 5 as they rotate about axis 7 of rotor axle 12. Permanent magnet disks 1 and 2 are supported by iron rings 13 and 14, and stator ring 3 is supported by housing 15.

Stator ring 3 contains multiple sets of sector-shaped coils 20 that each contain radial sections 22a and 22b and inactive sections 26 and 27. Coils 20 with uniform cross-section conductors provide empty areas 24 that cause loss of useful area resulting in loss of torque.

*Rao* reduces the air gap between the magnets to increase torque by reducing the axial thickness of the stator windings. The stator windings have plural coils that are assembled arcuately adjacent to one another with the active sectors of the radial sections in an essentially coplanar configuration and having tapered conductors that increase in width in the radial direction.

Phase coil 30 includes radial sections 31a and 31b, inner section 32 and outer section 33. Radial sections 31a and 31b include tapered electrical conductors that have increasing width as they progress from the inner radius to the outer radius. Radial sections 31a and 31b can have uniform width as they extend along the inner and outer radius and run essentially in lines around the axis of rotation of the rotor. Radial sections 31a and 31b can have a constant cross-sectional area by increasing and decreasing the thickness of the conductor as the width is decreased and increased respectively to give uniform resistance to current flow. Alternatively, the thickness of

the conductor can remain constant as the width expands so long as the cross-sectional area is sufficient to carry the current load.

Figure 3 illustrates the inner radius  $r_i$ , median radius  $r_m$  and outer radius  $r_o$  of the permanent magnets of the rotor superimposed on phase coil 30. Furthermore, in a typical three-phase motor, the stator contains three phase coils, such as phase coil 30, usually labeled phase A, phase B and phase C.

Thus, phase coil 30 is part of the stator.

Claims 6, 16, 51 and 67 have been amended to recite a "rotatable" spiral winding.

*Rao* fails to teach or suggest that phase coil 30 is rotatable. Instead, *Rao* discloses that phase coil 30 is a stator for a three-phase motor.

Under 35 U.S.C. §102, anticipation requires that each and every element of the claimed invention be disclosed in the prior art. *Akzo N.V. v. United States International Trade Commission*, 1 USPQ 2d 1241, 1245 (Fed. Cir. 1986), *cert. denied*, 482 U.S. 909 (1987). That is, the reference must teach every aspect of the claimed invention. M.P.E.P. § 706.02.

Therefore, Applicant respectfully requests that these rejections be withdrawn.

## II. SECTION 103 REJECTION – RAO AND YAMAMOTO ET AL.

Claims 63 is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Rao* in view of *Yamamoto et al.* (U.S. 4,728,390). Applicant submits this rejection is moot.

## III. OTHER AMENDMENTS

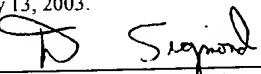
The Claims have been amended to improve clarity. No new matter has been added.

## IV. SUBSTITUTE SPECIFICATION

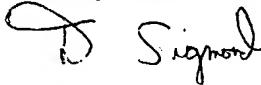
A Substitute Specification was filed with the previous Response. Applicant requests confirmation that the Substitute Specification has been entered in the next written communication.

## V. CONCLUSION

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 13, 2003.	
 _____ David M. Sigmund Attorney for Applicant	5,13,03 _____ Date of Signature

Respectfully submitted,



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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

### In the Claims

The claims have been amended as follows:

1        1. (Once Amended) A voice coil for a disk drive comprising: a spiral winding of  
2        conductive material defining a flat band with a generally triangular shape having an open center,  
3        first and second active leg portions and an inactive leg portion, a first curved corner portion  
4        connecting the first and second active leg portions, a second curved corner portion connecting the  
5        first active leg portion with the inactive leg portion, and a third curved corner portion connecting  
6        the second **active** leg portion with the inactive leg portion, the first and second active leg portions  
7        curving inward of the band, the inactive leg portion curving outward of the band.

1        6. (Once Amended) A voice coil for a disk drive comprising: a **rotatable** spiral winding  
2        of conductive material defining a flat band with a generally triangular shape with an open center,  
3        first and second active leg portions and an inactive leg portion, a first curved corner portion  
4        connecting the first and second active leg portions, a second curved corner portion connecting the  
5        first active leg portion with the inactive leg portion, and a third curved corner portion connecting  
6        the second **active** leg portion with the inactive leg portion, the cross-sectional area of the band  
7        varying along its length.

1        11. (Once Amended) In combination with an actuator member in a disk drive, a voice  
2        coil secured to a face of the actuator member, said voice coil comprising a continuous spiral  
3        winding defining a flat band with a generally triangular shape with an open center, first and  
4        second active leg portions and an inactive leg portion, a first curved corner portion connecting  
5        the first and second active leg portions, a second curved corner portion connecting the first active  
6        leg portion with the inactive leg portion, and a third curved corner portion connecting the second  
7        **active** leg portion with the inactive leg portion, the first and second active leg portions curving  
8        inward of the band, the inactive leg portion curving outward of the band.

1        16. (Once Amended) In combination with an actuator member in a disk drive, a voice  
2        coil secured to a face of the actuator member, said voice coil comprising a continuous **rotatable**  
3        spiral winding of wire defining a flat band with a generally triangular shape with an open center,  
4        first and second active leg portions and an inactive leg portion, a first curved corner portion  
5        connecting the first and second active leg portions, a second curved corner portion connecting the  
6        first active leg portion with the inactive leg portion, and a third curved corner portion connecting  
7        the second **active** leg portion with the inactive leg portion, the cross-sectional area of the band  
8        varying along its length.

1        31. (Once Amended) A voice coil for driving an actuator arm to various positions over a  
2        disk of a disk drive, the voice coil comprising:

3              a spiral winding of conductive material defining a band with a generally triangular shape  
4        having an open center, wherein the spiral winding includes:  
5              a first active leg portion that curves inwardly of the band;  
6              a second active leg portion that curves inwardly of the band;  
7              an inactive leg portion;  
8              a first curved corner portion connecting the first and second active leg portions;  
9              a second curved corner portion connecting the first active leg portion and the  
10      inactive leg portion; and  
11              a third curved corner portion connecting the second **active** leg portion and the  
12      inactive leg portion.

1        47. (Once Amended) A voice coil for driving an actuator arm to various positions over a  
2        disk of a disk drive, the voice coil comprising:

3              a spiral winding of conductive material defining a flat band with a generally triangular  
4        shape having an open center, wherein the spiral winding is adapted to interact with the magnetic  
5        field of permanent magnets of the disk drive, and the spiral winding is a continuous planar  
6        single-layer coil that includes:  
7              a first active leg portion that curves inwardly of the band;  
8              a second active leg portion that curves inwardly of the band;

9                   an inactive leg portion;  
10                  a first curved corner portion connecting the first and second active leg portions;  
11                  a second curved corner portion connecting the first active leg portion and the  
12                  inactive leg portion; and  
13                  a third curved corner portion connecting the second **active** leg portion and the  
14                  inactive leg portion.

1                 51. (Once Amended) A voice coil for driving an actuator arm to various positions over a  
2                 disk of a disk drive, the voice coil comprising:  
3                 a **rotatable** spiral winding of conductive material defining a band with a generally  
4                 triangular shape having an open center, wherein the spiral winding includes:  
5                 a first active leg portion defined by segments having a first cross-sectional area;  
6                 a second active leg portion defined by segments having a second cross-sectional  
7                 area;  
8                 an inactive leg portion defined by segments having a third cross-sectional area,  
9                 wherein the third cross-sectional area is smaller than the first cross-sectional area, and the third  
10                cross-sectional area is smaller than the second cross-sectional area;  
11                a first curved corner portion connecting the first and second active leg portions;  
12                a second curved corner portion connecting the first active leg portion and the  
13                inactive leg portion; and  
14                a third curved corner portion connecting the second **active** leg portion and the  
15                inactive leg portion.

1                 67. (Once Amended) A voice coil for driving an actuator arm to various positions over a  
2                 disk of a disk drive, the voice coil comprising:  
3                 a **rotatable** spiral winding of conductive material defining a flat band with a generally  
4                 triangular shape having an open center, wherein the spiral winding is adapted to interact with the  
5                 magnetic field of permanent magnets of the disk drive, and the spiral winding is a continuous  
6                 planar single-layer coil that includes:  
7                 a first active leg portion defined by segments having a first cross-sectional area;

8           a second active leg portion defined by segments having a second cross-sectional  
9       area;  
10          an inactive leg portion defined by segments having a third cross-sectional area,  
11       wherein the third cross-sectional area is smaller than the first cross-sectional area, and the third  
12       cross-sectional area is smaller than the second cross-sectional area;  
13          a first curved corner portion connecting the first and second active leg portions;  
14          a second curved corner portion connecting the first active leg portion and the  
15       inactive leg portion; and  
16          a third curved corner portion connecting the second **active** leg portion and the  
17       inactive leg portion.